Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): Method for regulation tree construction derived from an existing decision tree having the same structure as the existing decision tree in intelligent system applications to regulate the quality of the decision rules automatically comprising the following steps:

(a) Input an existing decision tree;

(b) Input a set of training samples;

(c) Determine statistics from the training samples for at least one non-terminal node and store in the decision tree structure;

(d) Determine statistics from the training samples for at least one terminal node and store in the decision tree structure;

(e) Select regulation parameters.

Claim 2 (original): The method of claim 1 wherein the statistics for at least one non-terminal node include mean distance.

Claim 3 (original): The method of claim 1 wherein the statistics for at least one non-terminal node include distance standard deviation.

Claim 4 (original): The method of claim 1 wherein the statistics for at least one terminal node include the likelihood value for a class.

Claim 5 (currently amended): A regulation tree application method in intelligent system applications to regulate the quality of the decision rules automatically comprises the following steps:

(a) Input a sample;

(b) Determine the likelihood values for at least one non-terminal node;

(c) Determine the likelihood value for a branch to at least one terminal node;

(d) Determine the confidence value for at least one class.

Claim 6 (original): The method of claim 5 wherein the likelihood values for at least one non-terminal node comprises a likelihood value for descending through the left branch and a likelihood value for descending through the right branch.

Claim 7 (currently amended): The method of claim 5 wherein the confidence value for a class c is determined by summing over all terminal nodes with their multiplication of non-terminal node branch likelihood values and the likelihood value for class c at terminal node using the following formula:

$$Confidence_c(X_{input}) = \sum_{jeterminal\_nodes} \prod_{sebranches\_to\_j} L^S(X_{input}) L^j_{class\_c}.$$

Claim 8 (currently amended): An automatic tree regulation method in intelligent system applications to regulate the quality of the decision rules automatically comprises the following steps:

(a) Determine the projected tree accuracies for a plurality of depths and a plurality of regulation parameter values;

(b) Select the optimal depth that yields the highest projected tree accuracy;

(c) Use the optimal regulation parameter value for the optimal depth.

Claim 9 (original): The method of claim 8 wherein the projected tree accuracy is determined by the following steps:

(a) Construct a regulation tree up to a given depth;

(b) Determine the projected tree accuracy;

(c) Determine a regulation parameter value based on projected tree accuracy.

Claim 10 (currently amended): A regulation tree terminal node update learning method in intelligent system applications to regulate the quality of the decision rules automatically comprises the following steps:

(a) Input a training sample;

(b) Input the true class of the training sample;

(c) Classify the input training sample using a crisp decision method to determine its associated terminal node;

(d) Update terminal node statistics.

Claim 11 (currently amended): The method of claim 10 wherein the terminal node statistics include the total weighted number of samples at the terminal node n, N^n, and the weighted number of samples of each class c at the terminal node n, N_c^n.

Claim 12 (currently amended): A regulation tree non-terminal node update learning method in intelligent system applications to regulate the quality of the decision rules automatically comprises the following steps:

(a) Input a training sample;

(b) Input the true class of the training sample;

(c) Classify the input training sample using a crisp decision method to determine its association with at least one non-terminal node;

(d) Update non-terminal node statistics.

Claim 13 (original): The method of claim 12 wherein the non-terminal node statistics include mean distance and the distance standard deviation.

Claim 14 (currently amended): A regulation tree update learning method for new classes in intelligent system applications to regulate the quality of the decision rules automatically comprises the following steps:

(a) Perform new regulation tree construction in addition to the original regulation tree;

(b) Perform a compound tree update.

Claim 15 (original): The method of claim 14 wherein the new tree construction further comprises the following steps:

(a) Input at least one sample from a new class;

(b) Check to confirm the sample size is greater than the minimal required sample size for the new class;

(c) Construct a new compound tree for all existing classes and the new class.

Claim 16 (original): The method of claim 14 wherein the compound tree update further comprises the following steps:

(a) Input a new sample and its class;

(b) Update all trees trained to include the input class.

Claim 17 (currently amended): A compound tree application method in intelligent system applications to regulate the quality of the decision rules automatically comprises the following steps:

(a) Input a sample to be applied;

(b) Apply the sample to all trees;

(c) Combine the results from all trees.

Claims 18-19 (canceled)

Claim 20 (currently amended): A focusing tree construction method in intelligent system applications to regulate the quality of the decision rules automatically comprises the following steps:

(a) Input a set of training samples;

(b) Generate a new weight for each training sample;

(c) Generate a new tree using the new weight.

Claim 21 (original): The method of claim 20 wherein generate new weight for each training sample further comprises the following steps:

(a) Determine the sample's discrimination merit;

(b) Derive the sample's weight update factor;

(c) Generate the new weight for the sample.

Claim 22 (currently amended): A focusing tree application method in intelligent system applications to regulate the quality of the decision rules automatically comprises the following steps:

(a) Input a sample to be applied;

(b) Classify the input sample by the first tree;

(c) If the classification reliability > threshold, use the current result as the final result and stop;

(d) Else, classify the input sample by the focus tree and use the new result as the final result.

Claim 23 (canceled)

Claim 24 (original): The method of claim 20 is repeated multiple times to create multi-stage focusing trees.